

WHAT IS CLAIMED IS:

1. A LED device, comprising:

a base having a recess with the upper surface opened,
the inner wall surface of the recess constituting a
5 reflection surface;

a LED chip disposed on the inner bottom of the recess;

a resin filled in the recess, the resin including
phosphors which absorb a part of light emitted from the LED
chip to convert the wavelength thereof and emit light; and

10 a phosphor layer formed on the reflection surface, the
phosphor layer including the phosphors.

2. A LED device as claimed in Claim 1, wherein the
emitting wavelength of the LED chip is 430nm or below.

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3. A LED device as claimed in Claim 1, wherein the
phosphor layer comprises a plurality of phosphor layers
each of which is excited to emit a different wavelength of
light from each other.

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4. A LED device as claimed in Claim 3, wherein the
plurality of phosphor layers are so arranged that the
phosphor layer closer to the outside emits the shorter
wavelength of light.

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5. A LED device as claimed in Claim 1, wherein the phosphor layer is formed by a method selected from the group consisting of vacuum depositing, printing and ink-jet applying.

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6. A LED device as claimed in Claim 1, wherein the phosphors are enclosed by micro-capsules each comprising Si as a main component.

10 7. A LED device as claimed in Claim 1, wherein the base is made of glass or metal material.

15 8. A LED device as claimed in Claim 1, wherein the phosphor layer is overlaid on a metal plating applied on the reflection surface.

9. A LED device as claimed in Claim 8, wherein the metal plating is applied by means of a composite plating method in which electrodeposition is conducted as the 20 phosphors are dispersed in the plating liquid of the metal plating.

10. A LED device, comprising:
a base having a recess with the upper surface opened,
25 the inner wall surface of the recess constituting a

reflection surface;

 a LED chip disposed on the inner bottom of the recess;
 a resin filled in the recess, the resin including
 phosphors which absorb a part of light emitted from the LED
5 chip to convert the wavelength thereof and emit light; and
 an ultraviolet rays reflecting material applied on the
 reflection surface.

11. A LED device as claimed in Claim 1 or 10, wherein
10 mirror surface particles each having a mirror surface are
 dispersed in the surface layer of the resin filled in the
 recess at the rate of 10 % or below of the surface area.

12. A LED device as claimed in Claim 1 or 10, wherein
15 the LED device further comprises a reflection resin layer
 disposed on the opening of the recess separately from the
 resin, the reflection resin layer being formed on or glued
 to the resin, the reflection resin layer including mirror
 surface particles each having a mirror surface.

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13. A LED device as claimed in Claim 1 or 10, wherein
 dyes are mixed in the resin.

14. A LED device as claimed in Claim 1 or 10, wherein
25 the LED device is provided with an ultraviolet cut filter

or ultraviolet reflection member for cutting ultraviolet light having a wavelength of 400nm or below on the opening of the recess.

5 15. A LED device as claimed in Claim 1 or 10, wherein the LED device is provided with a phosphor thin layer including the phosphors on the opening of the recess, the surface of the phosphor thin layer being trimmed using a laser trimming method.

10 16. A LED device as claimed in Claim 1 or 10, wherein a heat pipe may be disposed inside the base.

15 17. A LED device as claimed in Claim 1 or 10, wherein the center portion of the bottom of the base is protruded below.